REMARKS

Claims 1-21 are pending in the present application. Claim 1 has been amended herein. In view of the remarks set forth herein, Applicants respectfully request reconsideration of the application and issuance of a formal Notice of Allowance with respect to claims 1-21.

35 U.S.C. § 103

Claims 1, 9 and 11-14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,366.537 to Schlichting ("Schlichting"). Regarding claim 1, it is alleged, at page 3 of the Office Action, that Schlichting "teaches a process for smelting iron ore and/or refining molten iron by oxygen and a carbonaceous fuel . . . with supersonic speed . . . , which reads on the refining ferroalloy by blowing oxygen and metallurgical [sic] acceptable particle material with supersonic gas jets as recited in the instant claim." Applicants respectfully traverse.

Schlichting discloses a process for combusting carbonaceous material and oxygen in a smelting and/or refining operation, and an apparatus for delivering the carbonaceous material and oxygen to the furnace. The purpose of the process and apparatus of Schlichting is to increase the heat of combustion in the furnace in order to increase the speed of the reactions occurring within the furnace (Abstract). More specifically, at column 1, lines 48-55 of Schlichting, it is stated that "[t]he carbonaceous material is injected into the molten bath to recarburize the melt, and oxygen is simultaneously injected into the molten bath. The oxidation of the additional carbon and the subsequent secondary oxidation of the resulting carbon monoxide result in the release of sufficient additional energy to maintain the temperature of the melt and to melt the cold scrap additions" (emphasis added). Thus. Schlichting's process is used to increase the heat of combustion by adding combustible carbonaceous material and oxygen to the metallurgical vessel.

In effect, the teaching of Schlichting is contrary to that of the presently amended claims, which call for introducing particulate material to provide a "cooling effect." Specifically, the present Specification at page 4, lines 12-29, discusses various reasons that the introduction of the metallurgically acceptable particulate material has a coolant effect that helps to limit or control the temperature rise resulting from the exothermic reaction between carbon and oxygen to form carbon monoxide. Claim 1 has been amended to clarify that the metallurgically acceptable particulate material is capable of providing a cooling effect, which finds support in the present Specification at page 4, lines 8-29. Claim 1 has not been amended for any other purpose. Thus, the carbonaceous fuel stream of Schlichting does not teach or suggest all of the features of the metallurgically acceptable particulate material stream of amended claim 1, and in fact teaches opposite to that called for in amended claim 1. Accordingly, one of skill in the art would not look to Schlichting for teaching or guidance to arrive at amended claim 1 because Schlichting teaches in a directon opposite to that provided for in claim 1. Therefore, Applicants respectfully submit that Schlichting does not teach or suggest all of the features of present claim 1.

It is further alleged regarding claim 1, at pages 3-4 of the Office Action, that the speeds of the streams described in Schlichting at col. 3, lines 14-19 "read on the first and second supersonic gas jets as recited in the instant claim." Whether or not this allegation is true (without admitting that it is), for the reasons described above Schlichting cannot be properly modified so as to teach or suggest any of the present claims.

Applicants submit that, since claim 1 is not rendered obvious by Schlichting as modified, for the above reasons, claims 9 and 11-14, which depend from claim 1, are also non-obvious. *See In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). ("If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." MPEP § 2143.03 at page 2100-142.) Applicants therefore respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 1, 9 and 11-14.

Claims 15-18 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Schlichting in view of U.S. Patent No. 6,558,614 B1 to Fritz ("Fritz").

The deficiencies of Schlichting have been discussed above with regard to amended claim 1. Fritz, which discloses a method for producing a metal melt involving the charging of solid metal oxides and a lance for use in the method, does nothing to rectify the deficiency of Schlichting, namely that Schlichting does not disclose the use of a metallurgically acceptable particulate material which is capable of providing a cooling effect, as called for in amended claim 1. Fritz does not teach or suggest providing a coolant effect, because Fritz discloses blowing oxygen into the melt for the purpose of further combusting undesirable components of the melt, which will increase the heat in the melt (col. 4, lns. 12-16), and which is contrary to what is being claimed. Therefore, since neither Schlichting nor Fritz teaches this feature of amended claim 1, the combination of these references cannot suggest such a feature.

Applicants submit that, since claim 1 is not rendered obvious by the combination of Schlichting and Fritz for the above reasons, claims 15-18, which ultimately depend from claim 1, are also non-obvious. *See In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and MPEP § 2143.03 at page 2100-142 as cited above. Applicants therefore respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 15-18.

Claims 2-8, 10 and 19-21 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Schlichting in view of U.S. Patent No. 6,409,793 B1 to Edlinger ("Edlinger"). At page 6 of the Office Action, it is admitted that Schlichting does not specify specific metallurgically acceptable materials. However, it is alleged, at page 7 of the Office Action, that "it would have been obvious to . . . use the chromium-containing dusts as taught by [Edlinger] in the process of [Schlichting] in order to obtain high-grade ferrochromium alloy".

Edlinger, in its Abstract, discloses a method for processing slags and iron carriers. using chromium dust injected into the slag and/or melt, in order to produce environmentally safe slags and high-grade ferrochromium alloys. Nothing in Edlinger rectifies the deficiency of Schlichting discussed above. Therefore, Applicants respectfully submit that neither of the references individually, nor the references combined, teaches or suggests amended claim 1.

Further, MPEP § 2143.01(V) states that "[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no

suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)". MPEP at 2100-140. The purpose of Schlichting is stated at column 1, lines 14-19: "the invention concerns the introduction of oxygen and carbonaceous fuel into the furnace through a lance in such a manner that the volatile matter content of the fuel is combusted in a fashion permitting optimum utilization of the heat of combustion in the smelting or refining operation." Simply stated, the purpose of Schlichting is to increase combustion within the melt.

If the carbonaceous fuel of Schlichting were replaced with the chromium dust of Edlinger, there would be no carbonaceous fuel present in the invention of Schlichting to increase combustion, and the invention of Schlichting would therefore be unsatisfactory for its intended purpose. Further, combining the carbonaceous fuel of Schlichting with the chromium dust injection of Edlinger would defeat the purpose of Edlinger, namely to purify the slag produced (Abstract), because the carbonaceous fuel would increase the undesirable byproducts present in the slag. For these reasons, Applicants respectfully submit that there is no suggestion or motivation to combine Schlichting and Edlinger, and the Office has therefore failed to meet its burden of establishing a prima facie case of obviousness based on the combination of Schlichting and Edlinger.

Even if such a combination were proper, and it is respectfully submitted that it is not, the combination would still not suggest the presently claimed subject matter. The purpose of Schlichting, as discussed above, is to increase combustion within a metal melt. The purpose of Edlinger, also as discussed above, is to obtain environmentally friendly slag byproducts, and to produce a high-grade ferrochromium alloy. The present invention, as claimed and discussed at page 4, lines 26-32 of the Specification, lengthens the life of the refinery's converter liner and increases the productivity of the converter by lowering the temperature of the refining process.

A person of skill in the art at the time the present invention was made, trying to find ways to increase converter productivity and lengthen the life of the converter, would not have looked to either Schlichting, Edlinger, or any combination thereof, because neither reference discloses providing a cooling effect to the refining process, such as by using a metallurgically acceptable

particulate material which produces the desired results. Therefore, the references individually, or in combination, do not teach or suggest the presently claimed subject matter.

Applicants submit that, since claim 1 is not rendered obvious by the combination of Schlichting and Fritz for the above reasons, claims 2-8, 10 and 19-21, which ultimately depend from claim 1, are also non-obvious. *See In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and MPEP § 2143.03 at page 2100-142 as cited above. Applicants therefore respectfully request withdrawal of the 35 U.S.C. § 103(a) rejection of claims 2-8, 10 and 19-21.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request withdrawal of the 35 U.S.C. § 103 rejection of claims 1-21, and request the issuance of a formal Notice of Allowance for said claims as amended.

Should the Examiner have any questions about the above remarks, the undersigned attorney would welcome a telephone call.

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